CLAIMS

1. An electron gun arranged to produce an electron beam within a vacuum chamber and to direct the electron beam through an electron beam window into a region of higher pressure, including means to cause relative movement between the electron beam and the electron beam window to limit heating of the portion of the electron beam window transmitting the electron beam.

2. An electron gun, according to Claim 1, in which the electron beam window is formed from diamond.

3. An electron gun, according to Claim 1 or 2, in which the electron beam window is carried by a support arranged to dissipate heat generated by the passage of the electron beam through the window.

4. An electron gun, according to any preceding claim, in which the electron beam window comprises a single pane having a transverse dimension that is more than twice the transverse dimension of the electron beam, and the means to cause relative movement is a scanning means operable to cause continuous relative movement between the electron beam and the pane, whereby the electron beam will be transmitted through changing areas of the pane.

5. An electron gun, according to any of Claims 1 to 3, in which the electron beam window comprises a plurality of panes, and the means to cause relative movement is a scanning means operable to cause relative indexing between the electron beam and the plurality of panes, whereby the electron beam will be transmitted for a limited time by each pane in sequence.

6. An electron gun constructed and arranged substantially as described herein with reference to the accompanying drawings.

7. An electron beam window comprising a plurality of diamond panes which are each of a size to transmit an electron beam, and the panes are carried

by a support arranged to dissipate heat generated in any of the panes by the passage of an electron beam.

8. An electron beam window, according to Claim 7, in which the support is connected to a heat sink.

9. An electron beam window, according to Claim 8, in which the heat sink is secured to at least one surface of the support without obscuring the panes.

10. An electron beam window, according to any of claims 7 to 9, in which the support comprises a diamond disc that defines the panes and has an integral rim.

11. An electron beam window comprising a single diamond pane which has a transverse direction that is more than twice the transverse direction of the electron beam, the pane is carried by a support arranged to dissipate heat generated in the pane by the passage of the electron beam, and the support comprises a diamond disc that defines the pane and has an integral rim.

12. An electron beam window, according to Claims 10 or 11, in which the heat sink is shrunk onto the rim.

13. An electron beam window, according to Claim 12, in which the heat sink is diffusion bonded to the rim.

14. An electron beam window substantially as described herein with reference to the accompanying drawings.

15. An electron gun, according to any of Claims 1 to 6, provided with an electron beam window according to any of Claims 7 to 14.

16. A method of reducing the heating of an electron beam window by an electron beam in an electron gun, comprising moving the electron beam relative to the electron beam window.

17. A method, according to Claim 16 and in the case where the electron beam window comprises a single pane having a transverse dimension that is more than twice the transverse dimension of the electron beam,

comprising causing continuous relative movement transversely between the electron beam and the pane.

18. A method, according to Claim 16 and in the case where the electron beam window comprises a plurality of panes, comprising indexing the electron beam relative to the panes whereby the electron beam will be transmitted for a limited time by each pane in sequence.

19. A method of reducing the heating of an electron beam window by an electron beam in an electron gun substantially as described herein with reference to the accompanying drawings.